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THE EFFECTS ON MAMMALS OF DDT USED IN FOREST INSECT CONTROL IN THE NORTHERN ROCKY MOUNTAINS

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Increasing use of DDT for destroying insects has caused many persons to ask what effect extensive application of this poison has upon wildlife. Several observations have been made in the eastern United States, but none has been reported in forested areas in the western United States. During May 1947, 290,000 acres of forest were sprayed with DDT in an oil solution to control an epicemic of tussock moth (Hemerocampa pseudotsugata) in Idaho. In July and August, 500 acres were sprayed in northwestern Wyoming in an experimental attempt to control mountain pine beetle (Dendroctonus monticolae). These projects gave an opportunity to look for evidences of killing or injury to the indigenous wildlife. This report deals only with mammals. Similar studies of birds and fish which were conducted by other field parties will be reported elsewhere.

In Idaho, forests in the western foothills of the Bitterroot Mountains near Moscow were sprayed by airplane at the rate of one pound of DDT per acre. The trees principally affected by the tussock moths were Douglas-fir and grand fir. The vegetative habitat consisted of these species of trees as well as white pine, ponderosa pine, western redcedar, lodgepole pine and associated species. There was generally a heavy understory of several kinds of shrubs including willow, Oregon grape, service berry and Menziesia.

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Two study plots were established, one near the center, and one at the edge of the largest single area to be sprayed. The effects of DDT on mammals were observed both by direct field observations and by live trapping. Five species of mammals were trapped before, during and after spraying to determine population trends in relation to the spraying. The animals trapped were chipmunks (Eutamias ruficaudus simulans and E. amoenus luteiventris), white-footed mice (Peromyscus maniculatus artemesiae), red-backed mice (Clethrionomys gapperi saturatus), and jumping mice (Zapus princeps), in that order of frequency. No decreases in populations were apparent that could not be properly accounted for by causes other than DDT poisoning. Direct observations of the animals trapped as well as pine squirrels (Tamiasciurus hudsonicus), Columbian ground squirrels (Citellus columbianus), pocket gophers (Thomomys talpoides), black bears (Euarctos americanus), and white-tailed deer (Odocoileus virginianus) revealed no symptoms of DDT poisoning or evidence of deaths caused by the poison.

In Wyoming, four plots in the Snake River Range were sprayed with DDT in an experimental attempt to control the mountain pine beetle. The principal forest cover was lodgepole pine with an admixture of quaking aspen, Douglas-fir and alpine fir. The understory was sparse and composed of shrubs such as willows, honeysuckle, service berry and snowberry.

Three study plots were established. One (Plot 1) was on an area to be sprayed at the rate of 7½ pounds per acre, one (Plot 4) on an area to be sprayed with 5 pounds per acre. The third was an untreated control plot. Plot 1 was sprayed twice at eight-day intervals with 3-3/4 pounds of DDT per acre each time. Plot 4 was also sprayed twice, at eight-day intervals, with 2½ pounds each time.

Studies were made by trapping and by direct observation, as in the Idaho project. The animals trapped and observed were red-backed mice, field mice (Microtus longicaudus), white-footed mice, jumping mice, chipmunks (E. a. luteiventris) and pine squirrels.

The results of trapping showed no significant decrease in populations following spraying. Two species of animals showed symptoms that may have resulted from DDT poisoning. Chipmunks with tremors were observed, but there were relatively few of them affected. It was not definitely established if the symptoms resulted from DDT poisoning. A shrew (Sorex palustris navigator) showed typical symptoms of DDT poisoning. It was preserved, but a report of the autopsy is not yet available.

CONCLUSIONS

The evidence gathered from the above studies indicates that, in general, DDT in amounts up to 7½ pounds per acre has little or no adverse effects on mammals. A possible exception to this generalization is shrews, which may be susceptible to the poison in the heavier doses. Pending further evidence to the contrary, these conclusions can probably be generalized to apply to all forested areas of the northern Rocky Mountains. This is not to imply that opportunities for obtaining further evidence should be neglected. The study methods used have necessarily been rather crude and it is possible that more refined methods may produce conflicting evidence. On the other hand, all reports available from similar studies elsewhere have been substantially the same and have shown that mammals are relatively safe under most conditions of DDT use.

More detailed reports of the studies described above can be obtained by writing to the author.